

REMARKS

By this amendment, claims 1, 13 and 19 have been amended and claim 42 has been newly added. Claims 2, 3, 8-12, 14, 15, 23 and 34-41 have been previously cancelled. Accordingly, claims 1, 4-7, 13, 16-22, 24-33 and 42 are currently pending in the application, of which claims 1, 13, 19 and 42 are independent claims. Applicants respectfully submit that the above amendments do not add new matter to the application and are fully supported by the specification.

In view of the above Amendments and the following Remarks, Applicants respectfully request reconsideration and timely withdrawal of the pending objections and rejections for the reasons discussed below.

Specification Objection

In the Office Action, the specification has been objected to for failing to describe “depositing an indium zinc oxide (IZO) on the gate insulating layer”. This objection is respectfully traversed.

In this response, claim 13 has been amended to recite “depositing an indium zinc oxide (IZO) layer *on the gate pad* and the data wire”. Fig. 8 of the present application shows “A redundant gate pad 86 ... formed on the gate pad 24 ... connected through the contact hole 74” (Specification, page 17, lines 12-14). The redundant gate 86 is formed by depositing IZO layer on the gate pad and patterning the IZO pad. Thus, withdrawal of the objection is respectfully requested.

Drawing Objection

The drawings have been objected to for failing to show every feature of the invention specified in the claims. This objection is respectfully traversed.

As mentioned above, claim 13 has been amended to read "depositing an indium zinc oxide (IZO) layer *on the gate pad* and the data wire". Fig. 8 of the present application shows the redundant gate pad 86 formed on the gate pad 24. Thus, withdrawal of the objection is respectfully requested.

Claim Objection

In the Office Action, claim 13 was objected to for informalities. This objection is respectfully traversed because, in this response, claim 1 has been amended to recite --the gate pad-- after "exposing", as suggested by the Examiner. Thus, withdrawal of the objection is respectfully requested.

Rejections Under 35 U.S.C. §103

Claims 1 and 4-7 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U. S. Patent No. 6,433,842 issued to Kaneko, *et al.* ("Kaneko") in view of U. S. Patent No. 4,181,564 issued to Fogarty, *et al.* ("Fogarty"). Applicants respectfully traverse this rejection for at least the following reasons.

Independent claim 1 recites "forming a contact hole extending through the insulating layer and exposing the wire". An example of these claimed features are shown in Fig. 6B, which shows the step of forming the contact hole 74. As shown therein, the contact hole 74 extends through the insulating layer 30 and exposes the pad 24 formed of aluminum or an aluminum

alloy. Claim 1 further recites and “forming a conductive layer formed of indium zinc oxide (IZO) and *directly contacting* the wire through the contact hole”.

In this regard, the Examiner stated that Kaneko discloses “forming a contact hole 19 extending through the insulating layer 10 and exposing the wire 8” (Office Action, page 4). This assertion is respectfully disagreed with.

As clearly shown in Fig. 1 of Kaneko, the contact hole 19 is extended to exposes only the molybdenum-b wt % zirconium (Mo-8 wt % Zr) alloy layer 9, which is not an aluminum-based material. The contact hole 19 is *not extended to and does not expose* the aluminum-9.8 wt % neodymium (Al-9.8 wt % Nd) alloy layer 8, which is covered by the Mo-8 wt % Zr alloy layer 9.

For this reason, it is respectfully submitted that Kaneko fails to disclose or suggest “forming a contact hole extending through the insulating layer and exposing the wire” and “forming a conductive layer formed of indium zinc oxide (IZO) and *directly contacting* the wire through the contact hole”. These claimed features are not disclosed or suggested in Fogarty. Since none of the cited references discloses or suggests this claimed feature, it is respectfully submitted that claim 1 and its dependent claims 4-7 are patentable over them.

Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. §103(a) of claims 1 and 4-7.

Claims 13 and 18-22 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U. S. Patent No. 6,163,356 to Song, et al. (“Song”) in view of Kaneko and further in view of Fogarty. This rejection is respectfully traversed at least for the following reasons.

With respect to claims 13 and 18, amended independent claim 13 recites:

“13. A method for manufacturing a thin film transistor array panel, comprising steps of:
forming a gate wire formed of an aluminum-based material, the gate wire including a gate pad;
depositing a silicon nitride layer over the gate wire at a temperature between about 280° C and about 400° C to form a gate insulating layer;
forming a semiconductor layer on the gate insulating layer;
forming a data wire on the semiconductor layer;
forming a contact hole extending through the gate insulating layer and exposing the gate pad;
depositing an indium zinc oxide (IZO) layer on the gate pad and the data wire; and
patterning the IZO layer to form a conductive layer *directly contacting* to the gate pad.”

First, it is submitted that none of the cited reference discloses or suggests “forming a contact hole extending through the gate insulating layer and exposing the gate pad”, as recited in claim 13.

Fig. 4b of Song shows depositing and patterning non-Al metal (e.g., Cr, Mo, Ta or Sb) to form the gate pad 15 to *completely cover* the Al gate line 13a and gate page 15b, respectively, because the gate pad 15a “using aluminum [has] a tendency to form hillocks on their surface” (Song, column 4, lines 38-50) .

In Fig. 4C, Song shows depositing silicon nitride to form a gate insulating layer 17. Fig. 4e shows forming the pad contact hole 59 extending through the silicon nitride layer 17. The pad contact hole 59 is extended to and exposing the gate pad 15, which is formed of *non-Al metal* to avoid hillocks. The pad contact hole 59 is *not extended to and does not expose* the Al gate pad 15a. In fact, Song teaches away from extending the contact hole 19 to expose the Al gate pad 15a because Song is directed to completely covering the Al gate pad 15a with the non-Al metal layer 15 to avoid hillocks.

Thus, Song fails to disclose or suggest “forming a contact hole extending through the gate insulating layer and *exposing the gate pad*” and “patterning the IZO layer to form a conductive layer *directly contacting* to the gate pad”, as recited in claim 13. As mentioned above, Kaneko and Fogarty also fail to disclose or suggest these claimed features. Since none of the cited references discloses or suggests these claimed featurese, it is submitted that claim 13 and its dependent claim 18 are patentable over them.

With respect to claims 19-22, independent claim 19 recites “forming a contact hole extending through the passivation layer and the gate insulating layer and exposing the gate pad” and “patterning the IZO layer to form a redundant gate pad *directly contacting the gate pad* through the contact hole. As previously mentioned, none of the cited references discloses or suggests these claimed features. Thus, it is respectfully submitted that claim 19 and its dependent claims 20-22 are patentable over them.

Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. §103(a) of claims 13 and 18-22.

Claims 16, 17, 24 and 25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Song in view of Fogarty, further in view of Kaneko, and further in view of U. S. Patent No. 6,399,222 to Arai, et al. (“Arai”). This rejection is respectfully traversed at least for the following reasons.

With respect to claims 16 and 17, as mentioned above, amended independent claim 13 is believed to be patentable over Song, Fogarty and Kaneko because, for example, they fail to disclose or suggest “forming a contact hole extending through the gate insulating layer and

exposing the gate pad” and “patterning the IZO layer to form a conductive layer *directly contacting* to the gate pad”, as recited in claim 13.

Arai is directed to forming a silicon oxide barrier layer between an alkali glass substrate and an organic EL structure. However, Arai does not disclose or suggest those claimed features missing from Song, Fogarty and Kaneko. Since none of the cited references discloses or suggests these claimed features, it is submitted that claim 13 is patentable over them. Claims 16 and 17 are dependent from claim 13 and would be also patentable at least for the same reasons.

With respect to claims 24 and 25, as mentioned above, amended independent claim 19 is believed to be patentable over Song, Fogarty and Kaneko, because, for example, they fail to disclose or suggest “forming a contact hole extending through the passivation layer and the gate insulating layer and exposing the gate pad” and patterning the IZO layer to form a redundant gate pad directly contacting the gate pad through the contact hole”.

As mentioned above, Arai fails to disclose or suggest these claimed features. Since none of cited references discloses or suggests these claimed features, it is submitted that claim 19 is patentable over them. Claims 24 and 25 are dependent from claim 19 and would be also patentable at least for the same reason.

Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. §103(a) of claims 16, 17, 24 and 25.

Double Patenting

Claims 1, 4-7, 13, 16-22 and 24-33 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-31 of

U. S. Patent No. 6,287,899 ("Park") in view of Kaneko and Fogarty. This rejection is respectfully traversed at least for the following reasons.

To obviate the rejection, Applicants submit a Terminal Disclaimer attached hereafter. Accordingly, withdrawal of the double patenting rejection is respectfully requested.

Other Matters

In this response, claim 42 is newly added to cover the disclosed invention from different perspectives. Claim 42 recites "depositing a silicon nitride layer on the wire at *a fixed temperature* between about 280° C and about 400° C".

In the Office Action, the Examiner admitted that Kaneko fails to disclose depositing the silicon nitride insulating layer 10 at a temperature of between about 280° C and about 400° C (Office Action, page 4). Regarding this missing feature, the Examiner asserted that "[Fogarty] suggests forming a silicon nitride layer at a temperature between 270°C and 375°C for a period of about 45 minutes" (Office Action, page 4). This assertion is respectfully disagreed with.

Fogarty is directed to *incrementally decreasing* the wafer temperature during the deposition of the silicon nitride layer, in order to produce "sloped sidewalls without the necessity of this careful control of etching time ... the angel of the sidewalls at the deposition surface should be less than 60 degrees" (column 4, lines 1-5). For example, "the wafers were initially heated to a temperature of 375 degrees C at the time of activation of the rf power source. At intervals of approximately 10 minutes, the rheostat was set to lower the temperature approximately 25 degree C. A final temperature setting of 270 degrees C was made after 40 minutes and maintained until the end of the deposition" (column 3, lines 18-24).

If the wafer temperature is fixed and not incrementally decreased during the deposition of the silicon nitride layer, the sloped sidewalls would not be formed. Thus, it is submitted that Fogarty teaches away from using a fixed temperature. For these reasons, it is submitted that claim 42 is patentable over the cited references.


CONCLUSION

Applicants believe that a full and complete response has been made to the pending Office Action and respectfully submit that all of the stated objections and grounds for rejection have been overcome or rendered moot. Accordingly, Applicants respectfully submit that all pending claims are allowable and that the application is in condition for allowance.

Should the Examiner feel that there are any issues outstanding after consideration of this response, the Examiner is invited to contact the Applicants' undersigned representative at the number below to expedite prosecution.

Prompt and favorable consideration of this Reply is respectfully requested.

Respectfully submitted,



Hae-Chan Park
Reg. No. 50,114

Date: April 21, 2005

McGuireWoods LLP
1750 Tysons Boulevard
Suite 1800
McLean, VA 22102-4215
Tel: 703-712-5365
Fax: 703-712-5280
HCP:WSC/tmk

ATTACHMENT: TERMINAL DISCLAIMER

\\COM\494021.2